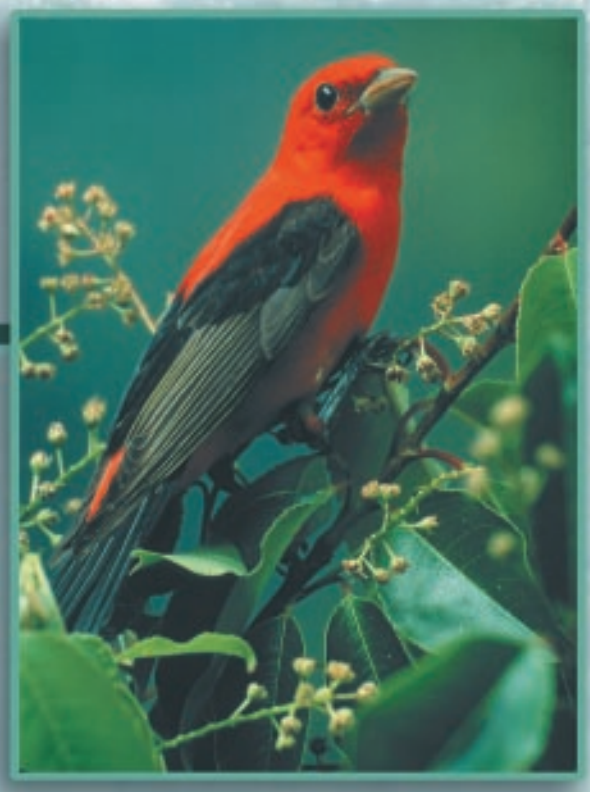
Delaware's Riparian Buffers



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Building a line of defense to protect our state's waters

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With the Delaware River and Bay along the state's entire eastern edge, no place in Delaware is far from water. Delaware's land—and each action carried out on the land—is inextricably tied to its waters. Whether it's our coastal rivers and bays or our freshwater streams and wetlands, these waters provide drinking water, food, and habitat for plants and animals, and enormous recreational benefits. Lining these waters with trees and grasses in the form of riparian buffers is a vital step in the effort to protect Delaware's water resources.

What are riparian buffers?

Riparian buffers are transition areas between water and land. They link terrestrial upland ecosystems to stream, river, lake, or wetland ecosystems. Buffers can be strips of grassy land leading to the water's edge or thickly forested streamside areas. They serve several important functions.

Protecting and improving water quality

The vegetation that grows along surface waters helps to remove pollutants by filtering or trapping toxics, nutrients, sediment, and pesticides from runoff. It also provides shade, thereby keeping water temperature and oxygen at levels appropriate for aquatic life.

Protecting and improving wildlife habitat and biodiversity

Fallen logs create pools and shelter for fish, insects, and other wildlife. Leaves and woody debris provide food and habitat for insects and other invertebrates, which are in turn eaten by fish and birds. Riparian buffers act as travel corridors and nesting sites for birds and help to provide suitable spawning habitats for fish. Buffer areas offer a tremendous diversity of streamside habitat and are home to many important species of amphibians, reptiles, birds, and insects.

Preserving floodplains and wetlands

Riparian vegetation in the floodplain slows the velocity of floodwaters, thus maximizing flood storage capacity. It also helps protect overbank areas from erosion during flooding. Many wetlands are adjacent to open water and are subject to periodic flushing of nutrient-laden sediments. Riparian buffers help protect wetlands by slowing and filtering runoff from storm events.

Protecting against erosion and preserving stream characteristics

Trees and other plants growing in riparian buffers help to stabilize streambanks with their root networks. Debris from the vegetation helps trap sediments in the runoff and slows the flow of water, allowing sediments and other pollutants to filter out before reaching surface waters. When streams are clogged with sediments, their filtering and storage capacity is severely reduced. Eroded streambanks also lead to wide, shallow streams that provide poor aquatic and terrestrial wildlife habitat.

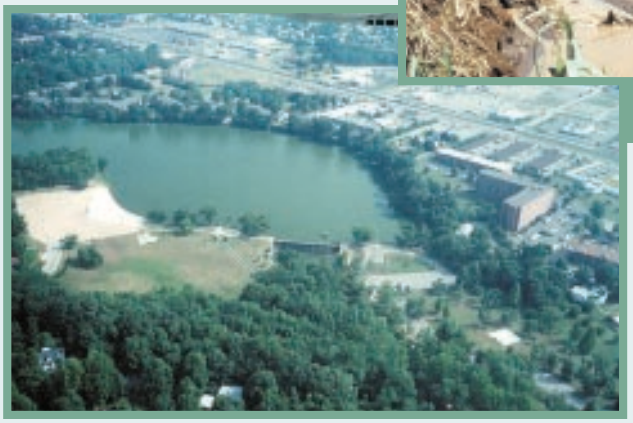
Providing recreational and aesthetic value

Hiking, biking, canoeing, fishing, bird watching, and photographing wildlife are just a few of the ways Delawareans enjoy riparian buffers.

By linking habitat areas such as fragmented forest areas with riparian buffers, many species like the scarlet tanager can benefit considerably.

Riparian buffers serve multiple purposes

Because riparian buffers provide so many different benefits, they can be used to serve many purposes. Grassed or tree-lined buffers at the edge of farm fields trap sediment and filter pesticides and fertilizer. Buffers in urban environments slow stormwater runoff from roads and parking lots. And buffers everywhere offer food and habitat for wildlife, as well as recreational opportunities for people.



Properly installed and maintained buffers can reduce sediment loss by nearly 75 percent.

On the farm

In agricultural areas riparian buffers slow water runoff and trap sediment, fertilizers, and pesticides before they enter waterways. Studies have shown that properly installed and maintained buffers can drastically reduce nutrient and pesticide runoff by up to 50 percent and reduce sediment loss by nearly 75 percent. Well-planned buffers can also improve the appearance of a farm while making use of highly erodible cropland or other environmentally sensitive lands that should not be cropped. Several incentive-based programs are available to encourage farmers to install riparian buffers on their land.

One of the most widely used programs in Delaware is the Conservation Reserve Enhancement Program (CREP). CREP is a conservation partnership between the U.S. Department of Agriculture and the State of Delaware that pays farmers to install riparian buffers, grassed filter strips, wildlife habitat, and hardwoods along streams and rivers instead of using the land for crop production.

Funding provided through CREP will help create buffers along many of Delaware's existing waterways to create and enhance wildlife habitat and to filter stormwater runoff prior to its discharge into ditches, streams, and rivers. Using new techniques such as limiting equipment access to one side of the stream and selectively clearing trees near ditches will also minimize environmental disturbances in and around streams and drainage ditches, aiding the establishment of riparian buffers. This year, CREP funds will allow an additional 1,200 miles of waterways to be lined with grassed filter strips and hardwood trees.

In the city

Although much of the research and literature on the water quality benefits of riparian buffers has centered on their use in agricultural settings, they can also provide important functions in the urban environment. Unlike natural landscapes, urban landscapes—filled with roads, bridges, parking lots, and buildings—don't let stormwater runoff slowly percolate into the ground. Urban stormwater runoff picks up pollutants like oil, sediment, pesticides, and nutrients as it runs across roads, parking lots, construction sites, and lawns and carries them to nearby streams and rivers.

Erosion and sediment control

In Delaware it's often difficult to develop land without being close to a body of water or a wetland. Construction associated with commercial, residential, and industrial development poses a challenge for water resource protection. But many professionals in the land development industry—design consultants, plan reviewers, and contractors—are recognizing the benefits of protecting and enhancing water resources with riparian buffers.

The following USDA conservation programs can provide technical and financial assistance to farmers to create and maintain riparian buffers, grassed filter strips, hardwood trees, or wildlife habitat:

Conservation Reserve Program (CRP) • Conservation Reserve Enhancement Program (CREP)

Environmental Quality Incentives Program (EQIP) • Wildlife Habitat Incentives Program (WHIP)

Wetlands Reserve Program (WRP) • Stewardship Incentives Program (SIP)

Emergency Watershed Protection Program (EWP).

For more information on these programs, visit USDA's web site at ww.nrcs.usda.gov/NRCSProg.html

Sediment from construction sites and new development can wreak havoc on our water resources. Although erosion and sediment control best management practices such as silt fences and sediment basins have become increasingly more effective over the years, these structural control measures are very costly, require a considerable amount of maintenance, and are seldom foolproof. The last line of protection between a land development project and a wetland or stream might be that buffer of trees and grasses that filters out sediment carried from the site by the last downpour. Even when effective erosion and sediment controls are in place and working, riparian buffers can polish water from a construction area, ensuring better water quality in streams and wetlands. They also allow stormwater runoff to infiltrate back into the soil and recharge groundwater aquifers. Some of the nutrients carried with the runoff are taken up by the buffer vegetation or removed through biological processes. Planning ahead for development will enable us put more of these important buffers to work for all of us in protecting our valuable aquatic resources.

Postconstruction stormwater management

Once a construction project has been completed, it does not cease to be a source of pollutants. Sediment loads might decline, but nutrient loads often increase as lawns become established and are maintained through the use of fertilizers. In addition, oils, bacteria, metals, and other pollutants from developed areas are carried along with stormwater runoff. Riparian buffers offer an effective and inexpensive alternative to traditional structural measures for managing postconstruction stormwater runoff.

As wildlife habitat

The plants and trees along the edges of wetlands and waterways provide food, nesting sites, shelter, and concealment for wildlife living in and moving along these natural corridors. In addition, riparian buffers serve as corridor connectors, linking existing habitats along the landscape and providing critical migration routes for many species. This "green infrastructure" can drastically improve the habitat and biodiversity in the region.

Many riparian landowners are familiar with the benefit of riparian buffer management to small game such as bobwhite quail and rabbits. However, landowners often are unaware of the benefits these habitats provide to many other species. The sound of a bobwhite quail, the buzz of many beneficial insects, and the opportunity to see a brilliantly colored songbird or butterfly are all made possible with well-planned riparian buffers.

Improving our quality of life

Not only do riparian buffers create natural corridors for wildlife, but they create natural corridors for people as well. Delaware's riparian buffers fit hand in hand with the state's Greenway and Trail Program, connecting our parks, forests, wildlife refuges, historical landmarks, and other open spaces where people can travel, exercise, and enjoy nature. More and more of these greenways are being created and used as riparian buffers, improving our quality of life as well as our precious water resources.

Delaware's Pea Patch Island boasts one of the largest heronries on the east coast, supporting more than 3,000 nesting pairs of herons, egrets, and ibises. Delaware's riparian buffers help protect their delicate breeding and feeding grounds.

Small game species like quail benefit from riparian buffers, especially in early successional years.

Improving the science of riparian buffers

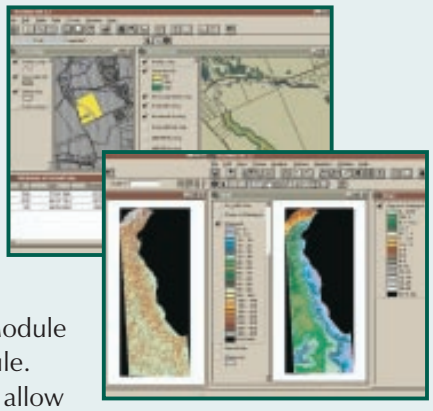
Delaware's Department of Natural Resources and Environmental Control (Division of Soil and Water Conservation) is working hard to educate the public on the many benefits of riparian buffers. Under a new Delaware Riparian Buffer Initiative, scientists at the Division of Soil and Water Conservation are developing a geographic information system (GIS) application as a tool that will enable planners, landowners, farmers, and resource managers to increase the use and effectiveness of riparian buffers and target urban and agricultural areas.

The Delaware Riparian Buffer Initiative

Although a variety of federal and state programs have created and restored riparian buffers in the past, the technical standards used in many of those programs did not always correspond with the specific needs and resources of a particular site. For example, they might not have considered the impact of the soil type, slope, and habitat requirements of a particular area on the effectiveness of a given buffer. To fill this need, the Division of Soil and Water Conservation's Delaware Riparian Buffer Initiative will result in the development of comprehensive site-specific riparian buffer criteria.

Geographic information systems: The new science for buffers

Using current buffer science and cutting-edge technology, scientists in the Division of Soil and Water Conservation are developing site-specific riparian buffer designs that specify width, vegetation type and distribution, and local conditions in the watersheds of Delaware. The designs are being developed in an ArcView geographic information system (GIS) application. This Riparian Buffer Analysis System (RBAS) combines layers of information (soil types, vegetation, endangered species) about a particular area to provide a better understanding of what kind of buffer should be installed there. It will create a defensible buffer design for each priority goal of the Initiative—surface water quality enhancement, nutrient runoff reduction, bank stabilization, erosion control, and habitat protection for key species.



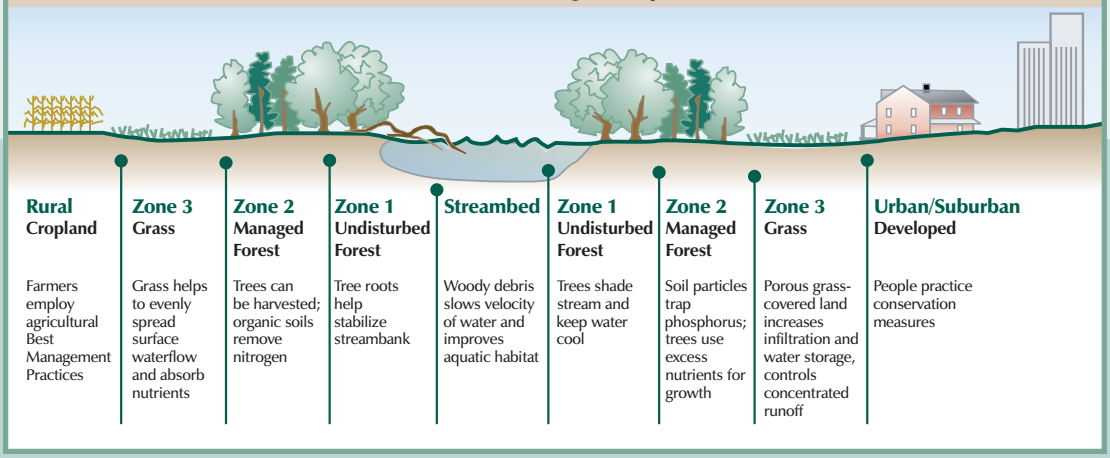
RBAS will consist of two separate but complementary modules—the Planning Module and the Site Design Module. The Planning Module will allow users to quickly identify and compare riparian areas. The Site Design Module will allow users to view a number of riparian buffer designs and select the design best suited to their needs. In addition to designs that address the priority goals of the Initiative, the system will include state and federal cost-share program options.

Using the RBAS, the Division of Soil and Water Conservation will provide staffing to conduct statewide landscape analysis for priority riparian buffers. In addition, they will provide technical services to county conservation district planners for site-specific buffer analysis and mapping. The Division of Soil and Water Conservation will also provide technical support and training to district staff interested in using the system independently.

Once RBAS has been developed, the Division of Soil and Water Conservation will help integrate the system into the conservation districts, where most riparian buffer projects in Delaware are planned and implemented. It will allow the conservation districts to better coordinate their efforts with the goals of improving water quality, filtering stormwater runoff, and creating and enhancing wildlife habitat.

Anatomy of a Riparian Buffer

The three-zone buffer concept provides a framework for the establishment and maintenance of a long-term riparian buffer.



Adapted from University of Maryland Cooperative Extension, Fact Sheet 724.

Zone 1 *consists of undisturbed mature trees immediately adjacent to the water body.*

Zone 2 *is a managed forest area of smaller trees and shrubs, which can be harvested as needed to remove accumulated nutrients and pollutants from the system.*

Zone 3 *is adjacent to the developed land and is typically planted in a grass cover to act as a sediment trap.*

"When the world was created, it was woven like a blanket, its threads interlaced and tied together. Everything in the blanket of life is connected. When harm comes to a single strand, the entire fabric becomes frayed and damaged. We must learn to walk gently upon the blanket of life before it unravels at our feet in ruins."

–Charles Clark IV, Assistant Chief, Nanticoke Indian Tribe

Vision for the future

Riparian buffers are a critical component of watershed protection and restoration throughout Delaware. The development of new buffer design criteria under the Delaware Riparian Buffer Initiative will help to shed light on the proper design, installation, and maintenance of buffers used in both agricultural and urban settings while protecting water quality, enhancing wildlife habitat, and providing recreational opportunities for the citizens of Delaware.

For more information on riparian buffers, contact:

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